

Patterns of Reduplication in Kikerewe*

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1. Introduction

The principles governing reduplication have recently been subject to renewed scrutiny within Optimality Theory under the impetus of McCarthy & Prince 1995. Bantu languages have provided a rich empirical domain for investigation in this area (Odden & Odden 1985, 1996; Kiyomi & Davis 1992; Mutaka & Hyman 1990 and Downing 1994, 1996, *inter alii*), since reduplication in Bantu languages often interacts in sometimes unexpected ways with other aspects of the phonology. This paper investigates reduplicative constructions in the Bantu language Kikerewe, spoken on the Ukerewe Islands in Lake Victoria, Tanzania.

Kikerewe presents five distinct patterns of reduplication for numbers, adjectives, nouns, as well as productive and lexical patterns for verbs. Throughout the language, reduplication is influenced by a common core of principles. Reduplication in Kikerewe is complete as opposed to templatic (i.e. limited to a single CV core syllable as in intensive formation in Agta (Healey 1960) or a CVCV foot as is the case with the Nguni languages and Kinande (Downing 1996, Kiyomi & Davis 1992, Mutaka & Hyman 1990)). There are two patterns of reduplicant minimality, one governing the portion of the reduplicant which corresponds to the stem, and a second governing the entire reduplicant. Tones may be excluded from the reduplicant; and finally, phonological fusion between base and reduplicant may result in overcopying of prefixal material, in a fashion similar to that

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found in Kihebe (Odden & Odden 1985, 1996), Chumash (Applegate 1976, McCarthy & Prince 1995) and Tagalog (Bloomfield 1933, McCarthy & Prince 1995).

The issue of domains arises recurrently in analysing Kikerewe reduplication, and it will be shown that there are a number of subtle variations on the notion of 'stem'. For example, all forms of reduplication copy the 'stem', and there is optional deletion of *y* which is initial in the 'stem': however, it turns out that the strings characterized by these two pretheoretical notions of 'stem' are not identical.

The essence of the notion 'stem' in Kikerewe — as in all Bantu languages — is that the root and following derivational affixes define the stem. Verbs provide the greatest degree of flexibility in illustrating the stem, since they have the greatest morphological resources for stem formation. The data in (1) provide examples of different stems, indicated in bold. In these examples, the root *-bal-* is followed by any number of derivational suffixes, and ultimately by a final tense-aspect affix. In the examples below, the final inflectional affix is *-a*, which is the most general of the inflectional affixes.

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|-----|------------------------------|------------------------------------|
| (1) | ku-bal-a | 'to count' |
| | ku-bal-il-a | 'to count for' |
| | ku-bal-isy-a | 'to cause to count' |
| | ku-bal-an-a | 'to count each other' |
| | ku-bal-il-an-a | 'to count for each other' |
| | ku-bal-isy-aan-y-a | 'to cause each other to count' |
| | ku-bal-il-isy-aan-y-a | 'to cause each other to count for' |

Other final affixes may be used in particular tenses: these include *-e* 'subjunctive' and *-ile* 'perfective'.

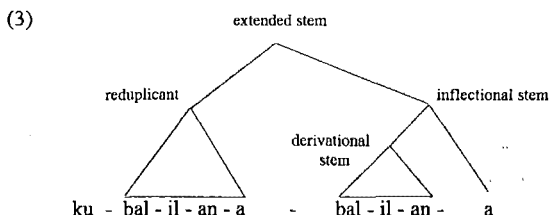
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|-----|--------------------|-------------------|-----------------------|------------------------------|
| (2) | ni-tu-bál-é | 'we should count' | ni-tu-bal-án-é | 'we should count each other' |
| | tu-baz-ilé | 'we counted' | tu-baz-éen-é | 'we counted each other' |

The stem forms an essentially autonomous morphological unit, where the structure of the stem is largely independent of the structure of the prefix domain.¹

The term 'stem' will be used here to refer to the root, any derivational affixes, and the final tense affix. It has proven useful in the analysis of Bantu languages to be able to refer to the portion of the stem which excludes the final inflectional affix, so the combination of root plus derivational extensions, excluding the final inflection, will be referred to as the 'derivational stem', in contrast to the 'inflectional stem' which is the full stem, including the final tense inflection.

¹ Properties of the stem must of course be consistent with the overall morphosyntactic properties of the verb, so for example if the stem of a simple transitive verb contains a reciprocal suffix, the subject prefix must be plural (that is to say *'I saw each other' is disallowed, but 'We saw each other' is possible). Similarly, if a verb is inflected in the perfective tense, that tense is marked by selection of appropriate prefixes as well as the perfective suffix, which is contained within the stem. Otherwise, though, the stem may be seen as morphologically completely independent from the prefixes of a verb.

There is a third notion of 'stem' which is relevant for the study of reduplication, and that is the structure which includes the reduplicant prefix plus the stem. The term 'extended stem' will be used to refer to this structure. Obviously, this structure is crucially distinct from the '(inflectional) stem' only in case a word is reduplicated: otherwise, the extended stem and (inflectional) stem are isomorphic.²



We will further assume that in Kikerewe the reduplicant mirrors the morphological structure of the primary stem: the reduplicant constitutes a stem domain as well, so reduplication is structurally similar to compounding. The assumption that the reduplicant defines a stem, in some sense, is motivated by the fact that the reduplicant itself behaves like a stem, in terms of a juncturally-defined tone rule.

A second notion which is important for the study of reduplication is that of the 'base'. It will be shown here that, unlike the stem, which is defined strictly by the morphology, the 'base' is a morpho-phonologically based construct with more flexible boundaries: it is, in fact, the same as the 'Phonological Stem' proposed in Downing 1996. Although the base tends to correspond to the morphological stem, it is not strictly restricted to the morphological stem, and its edges may be adjusted in response to phonological constraints. In this sense the 'base' is similar to the 'phonological word'. The phonological word generally corresponds to the grammatical word, but again its edges may be adjusted slightly in response to factors such as the presence of clitics, or size-requirements on reduplicants, *inter alii*.

We turn now to the reduplication constructions of Kikerewe.

2. Number Reduplication

Reduplication of numbers in Kikerewe straddles the boundary between word formation — reduplication proper — and syntactic concatenation. Numbers and number phrases are repeated in some fashion, to form the construction 'N by N', e.g. 'two by two'. It is argued that such repetition reflects reduplication in the case of a one-word

² The extended stem is distinct from the notion of 'macrostem' — cf. Mutaka & Hyman 1990, Odden 1996. The macrostem is the extended stem, as defined here, plus an object prefix. The notion 'macrostem', specifically including the object prefix, plays no apparent role in Kikerewe phonology or morphology. However, see Poletto (this volume) for a case showing that the macrostem is important in defining the base for reduplication in closely related Runyankore.

number, but syntactic concatenation in the case of a multiple word number expression. Examples of number reduplication and repetition are seen in (4).

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| (4) | gu-móó-gú-mo
Cl. 3-one Cl. 3-one | 'one by one (Cl. 3)' |
| | ba-bili-bá-bíli
Cl. 2-two Cl. 2-two | 'two by two (Cl. 2)' |
| | mukaaga-mukáága
six six | 'six by six' |
| | ikúmi n' oo-mw' íí'kúmi ¹ n' óó-mó
ten and Cl. 1-one ten and Cl. 1-one | 'eleven by eleven (Cl. 2) ³ |
| | ikúmi na bá-bíl' iikúmi na bá-bíli
ten and Cl. 2-two ten and Cl. 2-two | 'twelve by twelve (Cl. 2)' |
| | bihuumbi bí-bíli bihuumbi bí-bíli
thousands Cl. 8-two thousands Cl. 8-two | '2,000 by 2,000' |

The numbers 'one' through 'five' agree in noun class with their syntactic heads, an agreement which is realized as a prefix on the number (*ba-*, *o-*). Since identification of the number stem is important, the class agreement prefix is separated from the number stem by a hyphen.

There are phonological changes in this construction found only when the number being repeated is a single word, which argues that in such a case, true reduplication is involved rather than syntactic doubling. If the number stem is monosyllabic ('one', 'four'), the final vowel of the leftmost token of the number is lengthened.

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| (5) | gú-mó 'one (Cl. 3)' | gu-móó-gú-mo | 'one by one (Cl. 3)' |
| | kí-mó 'one (Cl. 7)' | ki-móó-kí-mo | 'one by one (Cl. 7)' |
| | lú-mó 'one (Cl. 11)' | lu-móó-lú-mo | 'one by one (Cl. 11)' |
| | ká-mó 'one (Cl. 12)' | ka-móó-ká-mo | 'one by one (Cl. 12)' |
| | bá-ná 'four (Cl. 2)' | ba-náá-bá-na | 'four by four (Cl. 2)' |
| | bí-ná 'four (Cl. 8)' | bi-náá-bí-na | 'four by four (Cl. 8)' |

There is a general prohibition against long vowels at the end of the phonological word in Kikereve, so lengthening here might seem to be problematic. However, if these structures represent reduplication rather than syntactic concatenation of independent words, such long vowels would be word-internal, hence not in violation of the constraint against final long vowels.

The examples of (5) can be contrasted with those of (6), which involve repetition of multiple-word number expressions. Note that the monosyllabic stems *-mo* and *-na* do not undergo lengthening here.

³ All vowel hiatus in Kikereve is resolved into a single syllable — see Odden 1995a for discussion. Underlyingly, this example derives from *ikúmi na omó ikúmi na omó*.

- (6) makúmy' áá-bili na gú-mó '21 (Cl. 3)'
 tens Cl. 6-two and Cl. 3-one
- makúmy' áá-bili na gu-mó má'kúmy' áá-bili na gú-mó '21 by 21 (Cl. 3)'
- maganá mwéenda na bá-ná '904 (Cl. 2)'
- hundreds nine and Cl. 2-four
- maganá mwéenda na ba-ná máganá mwéenda na bá-ná '904 by 904 (Cl. 2)'
- bihuumbi bí-ná '4,000'
- thousands Cl. 8-four
- bihuumbi bi-ná bihuumbi bí-ná '4,000'

This difference in whether the vowel of a monosyllabic stem is lengthened provides one reason to treat single-number repetition as word formation — as reduplication — rather than as syntactic concatenation as is the case for multiple-word numbers. The overall target in this construction is a structure with two occurrences of the number. This target can be accomplished either through the syntactic means of concatenating identical phrases, or by a word-formation process. The word-formation process is the preferred strategy, but a word formation strategy is available only when a single word is involved. With a number which is longer than a single word, the expression of the derived number construction cannot be accomplished using only the resources of morphology. Therefore, syntactic concatenation is required for such numbers. Though a tonal difference between multiple-word repetitions and single-word reduplication will be considered below, the focus will henceforth be on single-word reduplications.

The next question to be addressed is what the source of this vowel lengthening might be. As the examples in (7) show, there is no lengthening associated with polysyllabic stems.

- (7) babili-bábili 'two by two (Cl. 2)'
- basatu-básatu 'three by three (Cl. 2)'
- bináá-bína 'four by four (Cl. 8)'
- bataanu-bátáanu 'five by five (Cl. 2)'
- mukaaga-mukáága 'six by six'
- musaanzu-músáanzu 'seven by seven'
- munaana-munáána 'eight by eight'
- mweendá-mwéenda 'nine by nine'

One might assume that the stems *-mo* and *-na* underlyingly have long vowels, and that the long vowel in reduplicated numbers is simply retention of underlying length. However, there is evidence that these stems do not have long vowels, and that vowel length is generated as a result of reduplication itself. Except at the end of a phonological word where long vowels are prohibited, a vowel is always long if it is preceded by a sequence composed of a consonant plus a glide. If such a sequence appears at the end of a word, but is also followed by a clitic, then the vowel is not at the end of the phonological word, and therefore the word-final vowel surfaces as long.

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|-----|----------|--------------|---------------|----------------------|
| (8) | okabóna | 'you saw' | okabóná-gá | 'who did you see' |
| | okabásya | 'you caught' | okabá'syáá-gá | 'who did you catch?' |
| | énká | 'home' | nká-kí | 'which home?' |
| | émwá | 'dog' | mbwáá-kí | 'which dog?' |

If the number stems *-mo* and *-na* had underlying long vowel, then one would expect a long vowel to be preserved when these numbers are followed by a clitic. But as the data in (9) show, the vowel in these stems surfaces as short.

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| (9) | muuntw' oo-mo'-kí | 'which one man?' |
| | baná'-kí | 'which four (Cl. 2)?' |

Vowel lengthening is therefore a result of reduplication. In many languages, reduplicants are subject to a special prosodic condition of minimality: often, the reduplicant must be minimally bisyllabic or bimoraic (see for example Downing 1996, Kiyomi & Davis 1992, Mutaka & Hyman 1990). Apparently, this augmentation of monosyllabic stems in the reduplicant reflects a bimoraic minimality condition. Stems which are lexically bimoraic or longer naturally satisfy this reduplicant minimality condition.

There remains an important point to acknowledge, namely that, including the class agreement prefix, the reduplicant already contains two syllables. Considering *banáá+ba-na* 'four by four (Cl. 2)', it should be noted that the ideal reduplicant *baná* is already bimoraic since it is bisyllabic, one syllable each being contributed by the agreement prefix and the stem. Given that the agreement prefix is included in the reduplicant, it becomes less obvious why the stem vowel is lengthened. This quandry can be resolved by imposing a size condition on the portion of the reduplicant that corresponds to the stem, whereby it must be minimally bimoraic. An alternative is to impose an overall size requirement on the reduplicant to the effect that it must be longer than bimoraic.⁵ Since no data choose strongly between these alternatives at this point, and theoretical considerations do not weigh strongly in favor of one approach over the other, further refinement of the minimality condition will be suspended, and will be reconsidered after investigation of other conditions on the size of the reduplicant in other reduplication constructions. It will later be shown that there are two minimality conditions on the reduplicant: it must be at least bisyllabic, and the stem portion of the reduplicant must be at least bimoraic.

Numeral reduplication is associated with alternation in tone as well; these alternations raise questions about distinguishing the base versus reduplicant. When the number's stem contains two or more moras, the reduplicant — the leftmost token of the stem — surfaces as toneless.

⁴ The initial vowel *e* is a prefix whose distribution is subject to complex syntactic and semantic conditioning: it is lacking in nouns modified by *wh*-words.

⁵ Note that in all numerals lacking a class agreement prefix, such as *mweenda*, the stem contains three moras.

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|------|----------|-----------------|-------------------|--------------------------|
| (10) | bábili | 'two (Cl. 2)' | babili-bábili | 'two by two (Cl. 2)' |
| | básátu | 'three (Cl. 2)' | basatu-básátu | 'three by three (Cl. 2)' |
| | bátáanu | 'five (Cl. 2)' | bataanu-bátáanu | 'five by five (Cl. 2)' |
| | mukáága | 'six' | mukaaga-mukáága | 'six by six' |
| | músáanzu | 'seven' | musaanzu-músáanzu | 'seven by seven' |
| | munaána | 'eight' | munaana-munaána | 'eight by eight' |
| | ikúmi | 'ten' | ikum-ikúmi | 'ten by ten' |

The lack of tone in the leftmost element supports the assumption that the reduplicant is a prefix. A reduplicant is under different compulsions to be faithful to the base than the base itself is — see McCarthy & Prince 1994, 1995 and Odden & Odden 1996 for discussion of the emergence of unmarked structures in reduplication. There is an intrinsic tension between the markedness constraint *H which penalizes any occurrence of a H tone, and the faithfulness constraint Ident-IO(H), which requires all underlying tones to be realized on the surface. Since underlying H tones are generally preserved in Kikerewe, it is apparent that Max-IO(H) dominates *H. However, the form of the reduplicant is not determined by Max-IO(H), but rather by the separate constraint Max-BR(H) which requires base and reduplicant to have identical tones. The fact that the reduplicant appears as toneless then indicates that the markedness constraint *H dominates Max-BR(H).

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|------|---------------|-----------|------|-----------|
| (11) | RED-bá-bili | Max-IO(H) | *H | Max-BR(H) |
| | babili-babili | *1 | * | |
| | bábili-bábili | | *1*6 | |
| | babili-bábili | | * | * |

The lack of tone in the reduplicant also distinguishes between truly reduplicated numbers and two-word numbers such as *ikúmi n' óó-mw' i'kúmi' n' óó-mó* 'eleven by eleven (Cl. 2)', where no reduction in tone is found.

If the number has no H tone, a H tone appears on the final vowel of the reduplicant, as well as on the initial vowel of the base.

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|------|-------------------|------------------|
| (12) | mweendá-mwéenda | 'nine by nine' |
| | kihuumbi-kihuumbi | '1,000 by 1,000' |

These H tones have an independent explanation. At the phrasal level, when a noun is followed by a toneless modifier, a H tone is assigned to the final vowel of the noun. This H then spreads to the following syllable by bounded rightward spreading — singly-linked H tones are generally prohibited in the language.

⁶ A sequence of two adjacent H tones represents a single H, linked to multiple syllables, as dictated by a high-ranking constraint banning singly-linked H tones. Therefore, only two multiply linked H tones are present in this candidate, not four.

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|------|---------------------|--------------------|
| (13) | oluguhyo | 'broken pot' |
| | luukizaano | 'green (Cl. 11)' |
| | oluguhyó lúúkizaano | 'green broken pot' |
| | omugeni | 'stranger' |
| | mukokolo | 'old (Cl. 1)' |
| | omugení múkokolo | 'old stranger' |
| | ebikweema | 'cudgels' |
| | mweenda | 'nine' |
| | ebikweemá mwéenda | 'nine cudgels' |

While one might have expected **mweenda-mweenda* and **kihuumbi-kihuumbi*, the appearance of final H in the reduplicant can be explained by independent factors. Without going deeply into the details, when a stem precedes a toneless stem or word in certain 'close' morphosyntactic contexts, a H tone is assigned to the end of the first stem, due to a constraint referred to here as **Tone-Lapse*. Any combination of word plus word at the phrasal level necessarily involves the combination of a stem plus word or stem; by assumption, the reduplicant has the status of 'stem', and is therefore also subject to this juncturally-defined tone insertion.

The problematic tonal data involve tone alternations in the reduplicated form of monosyllabic numbers. As the data below show, the numbers '1' and '4' have an underlying H in the stem, and the prepausal forms also have a H on the vowel of the prefix. The stem-final H spreads leftward to the noun class prefix when the numeral is prepausal: the phrase medial form shows that the H is underlyingly on the final vowel of the stem. Such pre-pausal leftward spreading is exceptionless: no prepausal H is ever preceded by a toneless syllable in the language. The phrase-medial form further illustrates bounded rightward spreading from the stem of the number (*-na*, *-mo*) to the underlyingly toneless subject prefix of the verb (*-ba-*, *li-*).

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|------|-------|----------------|------------------|----------------------|
| (14) | bá-ná | 'four (Cl. 2)' | ba-ná bá-kabúla | 'four got lost' |
| | lí-mó | 'one (Cl. 5)' | li-mó lí-kalimwa | 'one was cultivated' |

However, in the reduplicated form, the rightmost token of the base lacks its lexical tone. On the surface, the final vowel of the reduplicant surfaces with a H tone due to the tone-lapse constraint.

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|------|-------|----------------|------------|------------------------|
| (15) | gú-mó | 'one (Cl. 3)' | gumóó-gúmo | 'one by one (Cl. 3)' |
| | lí-mó | 'one (Cl. 5)' | limóó-límo | 'one by one (Cl. 5)' |
| | bá-ná | 'four (Cl. 2)' | banáá-bána | 'four by four (Cl. 2)' |
| | bí-ná | 'four (Cl. 8)' | bináá-bína | 'four by four (Cl. 8)' |

Given that the reduplicant is a prefix, these structures exhibit the anomaly that the lexical H tone of the base must delete when preceded by a reduplicant. This raises the question of what motivates this deletion. No doubt, the presence of a single H is due to a tendency in the language that there should only be one H per word. The problem is that, as can be seen in polysyllabic numbers, the tone of the base is retained at the expense of

that of the reduplicant. One might stipulate a constraint which bans H in a stem just in case the stem is monosyllabic and is preceded by a reduplicant within the word, but the motivation for such a constraint is very unclear. The question of why the base is modified in this manner will therefore be left as a problem for future research. However, it should also be pointed out that this problem is not isolated to Kikerewe. Javanese has a pattern of vocalic replacement associated with reduplication (Dudas 1975, Kenstowicz 1985) where vowels of both the base and reduplicant are subject to vocalic replacement, somewhat in an attempt to make the vocalism of base and reduplicant non-identical. When the second vowel of the base is *a*, *a* is replaced by *ε* when reduplicated (assuming that the reduplicant is a prefix); when the first vowel is *a*, it is replaced by *o* in the reduplicant.

(16)	udan	udan-uden	'rain'
	kumat	kumat-kumet	'have a relapse'
	lali	lola-lali	'forget'
	adus	odas-adus	'bathe'
	salah	solah-seleh	'make a mistake'
	jaran	joran-reren	'horse'

To summarise, the following generalizations hold regarding the pattern of reduplication in numbers.

- (17) a. The class-agreement prefix is obligatorily copied: the base is defined as the whole word.
- b. The (prefix) reduplicant is toneless.
- c. The final vowel in the reduplicant of a monosyllabic stem is lengthened.
- d. The stem tone of a monosyllabic base is deleted when part of a reduplicated structure.

3. Adjectives

Reduplication of adjectives attenuates the semantic interpretation of the adjective, viz. 'kind of big'. Unlike number reduplication, adjective reduplication does not systematically include the noun class agreement prefix.

(18)	mu-háángo	'big (Cl. 1)'	mu-haango-háángo	'kind of big'
	mu-gága	'rich (Cl. 1)'	mu-gaga-gága	'kind of rich'
	mu-gázi	'wide (Cl. 3)'	mu-gazi-gázi	'kind of wide'
	i-bísi	'raw (Cl. 5)'	i-bisi-bísi	'kind of raw'

However, like number reduplication, the reduplicant in an adjective is toneless.

Another property common to adjective and number reduplication is that if the adjective stem is toneless, a H tone appears at the end of the reduplicant, and spreads rightwards into the base.⁷

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| (19) | mu-kokolo | 'old (Cl. 1)' | mu-kokoló-kócolo | 'kind of old' |
| | ba-zito | 'heavy (Cl. 2)' | ba-zító-zító | 'kind of heavy' |
| | ki-leehi | 'tall (Cl. 7)' | ki-leehí-léehi | 'kind of tall' |

This results from Tone-Lapse, which forces insertion of H at the end of a stem which precedes a toneless stem, as noted above.

Although noun class agreement prefixes are generally excluded from the reduplicant in adjective reduplication, in case the adjective stem is monosyllabic, the class prefix must be copied as well. In addition, the stem vowel is lengthened.

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|------|--------|-----------------|----------------|-----------------|
| (20) | bá-bí | 'bad (Cl. 2)' | ba-bíí-bá-bí | 'kind of bad' |
| | bí-hyá | 'new (Cl. 8)' | bi-hyáá-bí-hya | 'kind of new' |
| | tú-ké | 'few (Cl. 13)' | tu-kéé-tú-ke | 'kind of few' |
| | mú-tó | 'young (Cl. 1)' | mu-tóó-mú-to | 'kind of young' |

This again raises the question whether lengthening reflects retention of underlying length lost in word-final position, or length generated to satisfy a minimality condition. The diagnostic of pre-clitic length indicates that these adjectives have an underlying short vowel, hence vowel length in (20) is in satisfaction of a minimality condition.

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| (21) | ba-bí ¹ -kí | 'which bad (Cl. 2)?' |
| | tu-ké ¹ -kí | 'which few (Cl. 13)?' |
| | mu-tó ¹ -kí | 'which young (Cl. 1)?' |

It is true that when an adjective of the form CGV is followed by a clitic, as in *muhyáá¹-ki* 'which new (Cl. 1)?' the final vowel of the adjective is long. However, this is a result of the general principle that vowels are long after consonant+glide sequences, and thus such an example is irrelevant to the question of the basic length of monosyllabic stems. The data in (21) indicate that these stems do not have underlying long vowels, since one would expect a long vowel to be retained before a clitic. Therefore the lengthening seen in (20) is the result of 'bulking up' to satisfy the stem-minimality constraint on the reduplicant. This contrasts with prefixal overcopy, which is in response to a different minimality requirement, namely a bisyllabic minimum for the reduplicant as a whole.

So far, the only difference between adjective reduplication and number reduplication has been that the class agreement prefix is not generally copied under adjective reduplication, but is systematically copied under number reduplication, in order to satisfy the bisyllabic minimality requirement of the reduplicant. Copying of the class prefix is

⁷ One might alternatively see this as inserting H at the left edge of the base, which spreads to the left. However, there independently exists principles — the Tone Lapse constraints — which would assign H to a stem before a toneless stem.

required in another context: just in case there is phonological fusion between stem and prefix, the prefix must be copied. In this respect, reduplication of adjectives (and nouns, to be discussed in the following section) in Kikerewé operates like reduplication in Kihéhe (Odden & Odden 1985, 1996), where there is also exceptional overcopying of prefixal material under conditions of phonological fusion between prefix and stem.

Two contexts yield phonological fusion between prefix and adjective stem. The first is when the adjective stem is vowel initial; in that case, the V+V sequence arising at the juncture between prefix and stem is resolved into a single syllable in conformity with the general principles of syllable structure in the language, and when the adjective is reduplicated, the segmental material of the prefix is copied along with the stem syllable.

(22)	mw-íila	'hospitable (Cl. 1)'	mw-íilá-mw-íila	'kind of hospitable'
	mw-aangu	'quick (Cl. 1)'	mw-aangú-mw-áangu	'kind of quick'
	ly-aangu	'quick (Cl. 5)'	ly-aangú-ly-áangu	'kind of quick'
	k-ííngi	'a lot (Cl. 7)'	k-ííngi-k-ííngi	'kind of a lot'
	b-ééngi	'a lot (Cl. 2)'	b-eengi-b-ééngi	'kind of a lot'
	n-ííngi	'a lot (Cl. 10)'	n-ííngi-n-ííngi	'kind of a lot'
	mw-éélu	'white (Cl. 3)'	mw-eelu-mw-éélu	'kind of white'
	nn-élu	'white (Cl. 9)'	nn-eluu-n-élu	'kind of white' ⁸

The second context involves the class 9-10 agreement prefix *n-*, which assimilates in place of articulation to the following consonant (additionally causing the change of *h* to *p*, and *l* to *d*).

(23)	mú-hyá	'new (Cl. 1)'	m-pyá	'new (Cl. 9)'
	m-pyáá-m-pya		'kind of new (Cl. 9)'	
	mu-háángo	'big (Cl. 1)'	m-páángo	'new (Cl. 9)'
	m-paangoo-m-páángo ⁹		'kind of big (Cl. 9)'	
	mu-bísi	'raw (Cl. 3)'	m-bísi	'raw (Cl. 9)'
	m-bisii-m-bísi		'kind of raw (Cl. 9)'	
	mu-leehi	'long (Cl. 1)'	n-deehi	'long (Cl. 9)'
	n-deehíi-n-déehi		'kind of long (Cl. 9)'	
	mu-gúfu	'short (Cl. 1)'	n-gúfu ([ŋ-gúfu])	'short (Cl. 9)'
	n-gufuu-n-gúfu ([ŋgufuugúfu])		'kind of short (Cl. 9)'	

These data raise important questions about the notion of 'base' and its relation to 'stem' in reduplication. Much work in reduplication — for example McCarthy & Prince 1993, 1995 — tends to downplay the notion of 'base' as independent from the strictly morphological notion 'stem'. Downing 1996, however, has correctly pointed to the need

⁸ Geminate nasals are allowed only in utterance-initial position; cf. then *endaláá' nélu* 'white leopard', where the nasal degeminates (but transfers its mora to the preceding vowel). Thus in the reduplicated form, the base only has a simple nasal on the surface.

⁹ Except when a vowel is onsetless, a vowel is always long before a sequence of nasal plus consonant in Kikerewé. See Odden 1995a for further discussion.

for an independent structure Base, which is largely but not strictly coterminous with the stem. Such a notion of Base is necessary for characterising reduplication in Kikerewe. Consider the shape of the reduplicant in words such as *ba-bii-bá-bi*, where the agreement prefix is exceptionally copied in order to satisfy the constraint $\text{Red} > \sigma$. Under a conception of reduplicative base where the 'base' is simply the immutable morphological structure 'stem', it is difficult to predict the correct form of the reduplicant. The candidate which best matches the reduplicant to the base defined in this way would be **ba-bi-bi*, where the stem and reduplicant are exactly identical. The fatal flaw with this candidate is that the reduplicant is monosyllabic. A better candidate would be **ba-CVbi-bi* or **ba-biCV-bi*, where CV represents some constant phonetic sequence, most likely *yi* given the phonology of the language. This candidate satisfies the reduplicant bisyllabicity condition, at the expense of violating Dep-BR, i.e. introducing material which is not found in the stem.

This incorrect pattern of reduplication-with-epenthesis should be compared to the actual form *ba-bii-bá-bi*, where the reduplicant also contains material not found in the stem. Parallel examples like *mu-bii-mú-bi* 'bad (Cl. 1)' demonstrate that the extra material in the reduplicant is systematic: it is the syllable of the preceding prefix. The problem is that the shape of the reduplicant is assumed to be governed by constraints governing the relation of the reduplicant and the stem. Apart from a fixed-material augment such as *yi*, there would appear to be no other way to satisfy reduplicant minimality, short of recycling material from the stem as in **ba-bibi-bi*.¹⁰

A solution to this problem emerges once it is assumed that the Base is a phonological constituent whose edges are not necessarily identical with those of the morphological stem (see Odden & Odden 1996 for further discussion). Whether or not this constituent is constructed apart from reduplicated constructions remains an open question: see Downing 1996, who argues for such a structure independent of reduplication. For the purposes of this paper, the Base is called on only for reduplication. Generally, the base and stem are identical, per the following constraints.

(24) **Base-to-Stem Alignment**

Align(Base, R, Stem, R)

Align(Base, L, Stem, L)

Following Downing 1996, it is also assumed that the positioning of the reduplicant relative to the base is governed by a prosodic alignment constraint, rather than as the result of morpheme ordering in the input.

(25) **Reduplicant-to-Base Alignment**

Align(Redup, R, Base, L)

When the stem is monosyllabic, the left edge of the base must be adjusted leftward to include the agreement prefix, in order that the reduplicant — which copies the

¹⁰ Such a pattern of subminimal reduplication is found in Kinande (see Downing 1996, Mutaka & Hyman 1990).

base — be minimally bisyllabic. In the following tableau, the reduplicant is underlined and the base is indicated in boldface.

(26)

ba-RED-bi	Red> σ	Dep-BR	Integrity-BR ¹¹	RB-Align	Min Stem _{redup}	BS-Align
ba-bi- bi	*!					
ba-bi- bi-bi			*!			
ba- ba -bi- bi		b!a				
ba-bi- ba-bi		b!a		ba		
ba-bi- ba-bi					*!	*
ba-bii- ba-bi						*

Another constraint governing the left edge of the reduplicant is Syllable-alignment which requires the reduplicant to be aligned with the left edge of a syllable. This constraint is crucial in accounting for the reduplicative pattern of vowel-initial stems such as *mw-iila*.

(27) **Syllable-Alignment:** Align(Red,L, σ ,L)

Given that the base and reduplicant must be identical, any constraint which dictates the shape of the reduplicant in effect holds of the base as well. Since the reduplicant must be aligned on the left with a syllable, and since /mu+i/ inevitably forms a single syllable, then the reduplicant necessarily is *mwila*. Since the reduplicant and stem are identical, this means that *mw* must also appear in the base, even though including that material in the base entails violation of the constraint requiring the base to be aligned with the left edge of the stem.

(28)

mu-RED-ila	Ons	Syl-Align	Dep-BR	BS-Align
mw-iila-ila	*!	mw		
mw-iil-iila		m!w		
mw-iila- w-iila		m!		w
mw-iila- w-iila			m!	w
mw-iila- mw-iila				mw

In the examples of adjective reduplication considered so far, the reduplicant has been toneless, just as the reduplicant in number reduplication is toneless. However, reduplicated adjectives have an alternative pronunciation where the lexical tone of the stem is retained.

(29)

ma-bisi	ma-bisi'-bisi	'raw (Cl. 6)'
mu-fúla	mu-fúlá'-fúla	'kind (Cl. 1)'
mu-gága	mu-gágá'-gága	'rich (Cl. 1)'
mi-gúfu	mi-gúfú'-gúfu	'short (Cl. 4)'

¹¹ This constraint requires that every segment in the base have a unique correspondent in the reduplicant.

lu-háángo	lu-háángó'-háángo	'big (Cl. 11)'
lu-léénga	lu-lééngá'-léénga	'weak (Cl. 11)'
bi-gázi	bi-gazí'-gázi	'wide (Cl. 8)'
mu-gúmé	mu-gumé'-gúmé	'strong (Cl. 1)'
mu-zimá	mu-zimá'-zimá	'good (Cl. 1)'

Recall that H spreads rightward to a non-prepausal syllable, hence the alternation between *ma-bisi* and *ma-bisi'-bisi* from *ma-bisi-bisi*; furthermore, prepausal H spreads leftward so that /bi-gazi/ becomes *bi-gázi* and /bi-gazí-gazi/ becomes *bi-gazí'-gázi*. To derive the variant where lexical H tone is deleted in the reduplicant (*mufulafúla*), the constraint *H must dominate Ident-BR(H) which would otherwise force the reduplicant to mirror any H tone found in the base. Therefore, for the variant where H tones of the base are mirrored in the reduplicant (*mufúlá'-fúla*), the opposite ranking of these constraints is necessary.

Although both tonal variants exist, they are not attested with equal frequency. Further research is needed to establish solidly which of the two tonal variants is most frequent, but it appears that tone-deletion is more frequent than tone-retention if the adjective has a lexical stem-initial H (thus, forms like *luhaangoháángo* are the forms most frequently encountered), and tone-retention is weakly more frequent than tone-deletion if the stem has an underlying H on the final syllable (hence, *bi-gazí'-gázi* is somewhat more common than *bi-gazi-gázi*). In contrast, tone deletion in the reduplicant of numbers is exceptionless. Finally, it should be noted that reduplicated monosyllabic adjectives exhibit an anomalous tone pattern, a pattern also found in reduplicated monosyllabic numerals. As can be seen in (20), e.g. *babii-bábi*, the H tone in the base is missing, although otherwise the tone of the base is not affected by reduplication.

In summary, reduplication in adjectives exhibits the following traits.

- (30)
- The class agreement prefix is copied when the stem is monosyllabic.
 - The class agreement prefix is copied when it fuses phonologically with the stem.
 - A monosyllabic stem is lengthened in the reduplicant.
 - H tone of the base optionally deletes in the reduplicant, especially if the H tone is stem-initial.
 - The stem tone of a monosyllabic base deletes after a reduplicant.

4. Nouns

Reduplication in nouns operates according to principles which are nearly identical to those found in adjectives. Since the set of nouns in the language is open, one has the opportunity of inspecting a very wide range of phonological structures to see how they operate under reduplication. Nominal reduplication gives a noun the sense 'a real N'. As the examples of (31) show, the class prefix of the noun is not generally copied in a reduplicated noun.

- | | | | | |
|------|--------------|----------------|------------------------|---------------------|
| (31) | o-mu-gólé | 'queen' | o-mu-golé-gólé | 'real queen' |
| | o-mu-fúmu | 'medicine man' | o-mu-fúmú-fúmu | 'real medicine man' |
| | e-ki-swéélá | 'biting ant' | e-ki-sweelá'-swéélá | 'real biting ant' |
| | e-ki-kóómbe | 'cup' | e-ki-kóómbé'-kóómbe | 'real cup' |
| | e-bi-míiná | 'scorpion' | e-bi-miiná'-míiná | 'real scorpion' |
| | o-lu-bále | 'fishing pole' | o-lu-bálé'-bále | 'real fishing pole' |
| | o-lu-taaga | 'cassava' | o-lu-taagá'-taaga | 'real cassava' |
| | o-lu-paapulá | 'paper' | o-lu-paapulá'-páá'púlá | 'real paper' |

However, copying of the noun class prefix is sometimes allowed; such a variant occurs rarely, and is always optional (except under phonologically well-defined circumstances).

- | | | |
|------|------------------------|-------------------|
| (32) | e-ki-sweelá-ki'-swéélá | 'real biting ant' |
| | o-lu-taagá-lú-taaga | 'real cassava' |
| | e-ki-gaambó-kí-gaambo | 'real word' |

Copying of the noun class prefix is required under three circumstances — exactly the circumstances where prefix copying is required in adjectives. First, if the noun stem is monosyllabic, the noun class prefix must be copied.

- | | | | | |
|------|---------|-------------------|-------------|-----------------|
| (33) | Noun | Reduplicated noun | | Gloss |
| | e-ki-sa | e-ki-sá-kí-sa | *e-ki-sá-sa | mercy |
| | e-ki-me | e-ki-mé-kí-me | *e-ki-mé-me | dew |
| | e-ki-la | e-ki-lá-kí-la | *e-ki-lá-la | yam |
| | e-kí-ná | e-ki-ná'-kí-ná | *e-ki-ná-ná | fungal ringworm |
| | o-bú-ló | o-bu-ló'-bú-ló | *o-bu-ló-ló | millet |
| | o-mú-tí | o-mu-tí'-mú-tí | *o-mu-tí-tí | medicine |
| | a-má-tí | a-ma-tí'-má-tí | *a-ma-tí-tí | trees |
| | o-mú-bú | o-mu-bú'-mú-bú | *o-mu-bú-bú | mosquito |

Exceptional overcopying of the noun class prefix is required in nouns (as in adjectives), in order to satisfy the bisyllabic minimality requirement on the reduplicant.

The second context for obligatory prefix copy is when the noun stem is vowel initial: in that case, the class prefix fuses syllabically with the noun stem, so prefixal material is reduplicated along with the other segments of the stem. This is illustrated in (34) with combinations of nonidentical vocoid where the first vowel in the sequence is a high vowel: on the surface, such sequences are resolved by glide formation.

- | | | | | |
|------|-------------|--------------|------------------------|-------------|
| (34) | Noun | Underlying | Reduplicated | Gloss |
| | o-mw-óózó | /o-mu-ózó/ | o-mw-oozó'-mw-óózó | fellow |
| | o-mw-áágázi | /o-mu-ágázi/ | o-mw-áágázi'-mw-áágázi | virgin goat |
| | o-mw-áána | /o-mu-ána/ | o-mw-áána'-mw-áána | child |
| | o-lw-éémbo | /o-lu-émbo/ | o-lw-éémbo'-lw-éémbo | song |
| | e-ly-éeyo | /e-li-eyo/ | e-ly-éeyo'-ly-éeyo | broom |
| | o-mw-ííka | /o-mu-íka/ | o-mw-ííká'-mw-ííka | smoke |

o-bw-íimi	/o-bu-ími/	o-bw-íimi'-bw-íimi	stinginess
o-bw-óóngó	/o-bu-óngó/	o-bw-oongó'-bw-óóngó	brain

The class 7 prefix *eki-* is subject to a further modification, since *ky* becomes *ch*.

(35)	Noun	Underlying	Reduplicated	Gloss
	e-ch-aalamo	/e-ki-alamo/	e-ch-aalamó'-ch-áalamo	funeral
	e-ch-áála	/e-ki-ála/	e-ch-áálá'-ch-áála	finger
	e-ch-áamba	/e-ki-amba/	e-ch-áámbá'-ch-áamba	animal blood
	e-ch-ááya	/e-ki-áya/	e-ch-ááyá'-ch-ááya	anger

Copying of prefixal material as result of vowel fusion can be further illustrated with sequences of *a+V*, where the sequence of vowels is merged into a single non-high vowel.

(36)	Noun	Underlying	Reduplicated	Gloss
	a-m-óóyá	/a-ma-óyá/	a-m-óóyá'-m-óóyá	feathers
	a-m-éénó	/a-ma-ínó/	a-m-éénó'-m-ééno	teeth

Finally, sequences of identical vowels merge into a single long vowel, and prefixal copying is also found here.

(37)	Noun	Underlying	Reduplicated	Gloss
	a-b-áána	/a-ba-ána/	a-b-áána'-b-áána	children
	e-k-ííbo	/e-ki-íbo/	e-k-iibo-k-ííbo	basket
	e-b-ííbo	/e-bi-íbo/	e-b-iibo-b-ííbo	baskets
	e-l-ííno	/e-li-íno/	e-l-ííno'-l-ííno	tooth
	a-m-áálwá	/a-ma-álwá/	a-m-aalwá'-m-áálwá	beer
	a-m-ááni	/a-ma-áni/	a-m-ááni'-m-ááni	strength

The third context where there is prefix copying is when the noun appears in classes 9 or 10, which are characterized by the class prefix *-n-*. Monosyllabic noun stems in class 9-10 systematically require the noun class prefix *n-* to be copied.

(38)	Noun	Reduplication with copy	Reduplication without copy	Gloss
	é-n-zwí	e-n-zwí'-n-zwí	*e-n-zwí'-zwí	knee
	é-n-dá	e-n-dáá'-n-dá	*e-n-dáá'-dá	louse

There is a strong tendency for there to be overcopy of the noun class prefix with longer stems in classes 9 and 10.

(39)	Noun	Reduplicated noun	Gloss
	e-n-zóka	e-n-zókáá'-n-zóka	snake
	e-n-dálá	e-n-daláá'-n-dálá	leopard
	e-m-bozu	e-m-bozúú'-m-bózu	catfish
	e-m-pílyá	e-m-pilyáá'-m-pílyá	money

e-n-gábe	e-n-gábéé'-n-gábe	sitatunga
e-n-chúpa	e-n-chúpáá'-n-chúpa	bottle

Unlike the situation with sub-minimal monosyllabic stems or vowel initial stems where copying of the prefix is obligatory, copying of an assimilated nasal prefix in nouns of classes 9 and 10 is optional. This optionality can be distinguished from the existing option inherent in all noun reduplication that the prefix may be copied. Whereas copying of the class prefix with VCV- prefixes added to CVX nouns is a rarely exercised option, *failure* to copy the prefix *n* is a rarely exercised option.

(40) Marked Reduplication without prefix copy	Reduplication with prefix copy	Gloss
e-m-bebá-béba	e-m-bebáá-m-béba	rat
e-m-buunjá'-búunjá	e-m-buunjáá'-m-búunjá	jigger
e-m-bozú-bózu	e-m-bozúú-m-bózu	catfish

The tonology of reduplicated nouns is at least partially similar to that of reduplicated adjectives and numbers. If the noun stem is underlyingly toneless, a H tone appears on the final vowel of the reduplicant, and it spreads to the right by one syllable, a pattern previously seen with adjectives and numbers.

(41) Noun	Reduplicated noun	Gloss
a-ka-hooliimo	a-ka-hooliimó'-hóoliimo	chorus
c-kalumbeeta	c-kalumbeetá'-kálumbeeta	trumpet
e-ki-gaambo	e-ki-gaambó'-gáambo	word
e-bi-susano	e-bi-susanó'-súsano	photos
i-biingo	i-biingó'-bíingo	elephant grass
i-bogomelo	i-bogomeló'-bógomelo	waterfall
i-huna	i-huná'-húna	owl
kanamuunsaambwa	kanamuunsaambwá'-kánamuunsaambwa	skunk
o-bu-lagalika	o-bu-lagaliká'-lágalika	type of dance
o-bu-lemo	o-bu-lemó'-lémo	war
o-lu-gela	o-lu-gelá'-géla	basket tool
o-mu-buuki	o-mu-buukí'-búuki	fisherman

Another tonal similarity between nouns and adjectives (but not numbers) is that nouns optionally retain the tones of the base in the reduplicant, as many of the previous examples have shown, and as illustrated in (42).

(42) Noun	Underlying form	Reduplicated noun	Gloss
o-mu-gólé	o-mu-golé	o-mu-golé'-gólé	queen
o-mu-fúmu	o-mu-fúmu	o-mu-fúmu'-fúmu	doctor
o-lu-paapulá	o-lu-paapulá	o-lu-paapulá'-páá'púlá	paper
o-mw-iika	o-mw-iika	o-mw-iika-mw-iika	smoke
a-m-óóyá	a-ma-óyá	a-m-óóyá'-m-óóyá	feathers
e-n-chúpa	e-n-chúpa	e-n-chúpáá'-n-chúpa	bottle

The examples in (42) are to be contrasted with those below, where the reduplicant may surface as toneless.

(43)	Noun	Reduplicated noun	Gloss
	e-n-zóká	e-n-zokaa-n-zóká	snake
	e-ki-lááto	e-ki-laato-lááto	shoe
	e-ki-kóómbe	e-ki-koombe-kóómbe	cup
	e-ki-súsi	e-ki-susi-súsi	calabash
	o-lu-bále	o-lu-bale-bále	fishning pole
	o-lu-lábyo	o-lu-labyo-lábyo	lightening
	o-mu-fúmu	o-mu-fumu-fúmu	medicine man
	o-lw-éémbo	o-lw-eembo-lw-éémbo	song
	e-ki-nálanazyo	e-ki-nalanazyo-nálanazyo	punishment
	o-mw-áágázi	o-mw-aagazi-mw-áágázi	virgin goat
	e-ki-túúngúlu	e-ki-tuungulu-túúngúlu	onion
	e-ki-bilííti	e-ki-biliiti-bilííti	matches
	e-n-gúlúbe	e-n-gulube-n-gúlúbe	pig

Thus, tone deletion in the reduplicant of nouns is optional as it is with adjectives. Also similar to the pattern of adjectives, a lexical H is more likely to be deleted if the H is stem initial.

There is one striking difference between the treatment of nominal reduplicants and the treatment of adjectival reduplicants. Whereas the final vowel of a monosyllabic reduplicant lengthens to satisfy stem-minimality (cf. *omu-bíí-mú-bí* 'kind of bad (Cl. 1)'), there is no such lengthening in monosyllabic noun stems.

(44)	a-má-tá	a-má-tá'-má-tá	'milk'
	e-ki-bá	e-ki-bá'-ki-bá	'bundle'
	e-ki-ná	e-ki-ná'-ki-ná	'fungal ringworm'
	e-ki-lá	e-ki-lá'-ki-lá	'yam'
	e-ki-me	e-ki-mé-ki-me	'dew'
	a-má-tí	a-má-tí'-má-tí	'trees'
	a-má-ni	a-má-ní-má-ni	'liver'
	o-bú-tá	o-bú-tá'-bú-tá	'bow'

The lack of a final long vowel in a monosyllabic reduplicated noun stem might seem to indicate that the minimality constraint on stems in reduplicants only holds for numbers and adjectives. Further evidence argues that the lack of final long vowels in nouns is due to an independent factor, namely that the reduplicant in nouns must define a phonological word (and therefore a long vowel cannot appear at the end of the reduplicant). We have previously noted that vowels are always long within the phonological word when preceded by a sequence of consonant plus glide. When followed by a clitic, a vowel at the end of the morphological word will always be long when preceded by a C+G sequence, as observed in (8); further confirmation of this fact is seen in (45).

- | | | |
|------|------------------|----------------------------|
| (45) | o-mu-hyóó'-kí | 'which knife?' |
| | o-ku-twí'-kí | 'which ear?' |
| | a-ma-hwáá'-kí | 'which thorns?' |
| | e-ki-swáá'-kí | 'which anthill?' |
| | olu-lá'-byóó'-kí | 'which lightning?' |
| | i-gú'fwáá'-kí | 'which bone?' |
| | i-huuswá'-kí | 'which feather headdress?' |

As the data of (46) show, the reduplicant of these same stems nevertheless has a surface short vowel.

- | | | |
|------|------------------|---------------------|
| (46) | o-mu-hyó'-mú-hyó | 'knife' |
| | o-ku-twí'-kú-twí | 'ear' |
| | a-ma-hwá'-má-hwá | 'thorns' |
| | e-ki-swá'-kí-swa | 'anthill' |
| | olu-lábyó'-lábyo | 'lightning' |
| | i-gúfwá'-gúfwá | 'bone' |
| | i-huuswá'-húúswá | 'feather headdress' |

Since a short vowel after a C+G sequence is otherwise found only in word-final position (where long vowels are systematically prohibited), the short vowel at the end of a noun reduplicant can be handled by postulating that the reduplicant in a noun must be aligned at its right edge with a phonological word.

- (47) **Red-Word Alignment:** Align(Red(noun), R, Pword-R)

Consequently, reduplicated nouns and adjectives have different prosodic structures. Since (47) is undominated, noun reduplicants behave as though they are word-final and therefore cannot have a long vowel,¹² whereas the reduplicant in an adjective behaves as though it is word-medial and therefore may have a long vowel.

- (48)
- | | |
|--|--|
| <p>o-mu-hyo mu-hyo
'real knife'</p> | <p>mu-hyaa mu-hya
'kind of new (Cl. 3)'</p> |
|--|--|

Reduplicated nouns have thus been seen to observe the following principles.

¹² Word final long vowels are actually permitted. Vowels are always long before a sequence of a nasal plus a consonant, and since this lengthening is found at the phrasal level, one encounters word-final long vowels for example in *endaláá ndéehi* 'tall leopard'. Lengthening before NC is also found in reduplication, hence there is a long vowel at the end of the reduplicant in *enchúpáá' nchúpa* 'bottle'.

- (49) a. Prefixes are copied to satisfy the bisyllabic reduplicant minimality condition.
 b. Prefixes are copied when phonologically fused with the stem.
 c. The reduplicant ends a phonological word.
 d. Underlying H is optionally retained in the reduplicant.

5. Verbs

The fourth category of reduplication in Kikerewe is productive verbal reduplication. Such reduplication gives the verb the added connotation of action being done here and there, often without appropriate care. The following data from the infinitive illustrate basic examples of such reduplication.

- | | | |
|------|----------------------|----------------------------|
| (50) | ku-lima | 'to cultivate' |
| | ku-lima-lima | 'to cultivate haphazardly' |
| | ku-biba | 'to plant' |
| | ku-bibá-biba | 'to plant here and there' |
| | ku-kálaanga | 'to fry' |
| | ku-kálaanga-kalaanga | 'to fry any old way' |

In fact, there are two freely-varying strategies for reduplicating verbs, the full-copy variant and the asymmetrical-copy variant. We will begin with consideration of the full-copy variant.

5.1. Full Copy

In adjectives and nouns, reduplication preferentially excludes prefixal material, but copying of a prefix can be forced if there is phonological fusion between the prefix and stem, or when the stem is monosyllabic. In contrast to the situation with adjectives and nouns, verbal reduplication never allows copying of prefixal material. For example, the 1 sg. verbal subject prefix is *n-*, which assimilates to the following consonant just as the class 9-10 nominal prefix *n-* does. Unlike the nominal prefix, the subject and object prefixes *n-* do not overcopy under reduplication.

- | | | |
|------|-------------------------|------------------------------|
| (51) | n-teeka-tééká | 'I cook a bit' |
| | n-dima-límá | 'I cultivate a bit' |
| | m-pabuula-habúúlá | 'I advise here and there' |
| | n-dimile-limilé | 'I cultivated a bit (yest.)' |
| | n-kalaangile-kalaangílé | 'I fried off and on (yest.)' |
| | kuu-n-téékéla-teekela | 'to fry for me a bit' |

No verb stems are underlyingly vowel initial; however, stems with initial *y* optionally delete that *y* after a vowel.¹³ The surface outcome is that the initial stem vowel

¹³ Another possibility for analysing this alternation is that these stems are underlyingly vowel-initial, and *y* is optionally epenthesized in order to avoid violation of the Onset constraint. There is no contrast in

and the vowel of the preceding prefix merge into a single syllable. Despite this syllable fusion, there is no copying of the prefix.

- | | | | |
|------|-------------------------|-------------------------|----------------------------|
| (52) | ku-yáta-yata | kw-ááta-yata | 'to cut sloppily' |
| | tu-yaangile-yaangilé | tw-aangile-yaangilé | 'we disagreed somewhat' |
| | ba-yeta-yétá | b-eeta-yétá | 'they call here and there' |
| | tu-yeenda-yéendá | tw-eenda-yéendá | 'we kind of like' |
| | tu-ka-yínika-yinika | tu-k-éénika-yinika | 'we soaked a bit' |
| | wa-yílúkile-yilukile | w-éélúkile-yilukile | 'you sg. chased about' |
| | wa-tú-yilukile-yilukile | wa-tw-íilúkile-yilukile | 'you sg. chased us about' |

The third context where one might expect prefix copying, based on non-verbal patterns of reduplication, would be when the verb stem is monosyllabic. The following examples show that although the vowel of the reduplicant is long (presumably in satisfaction of a minimality requirement), the preceding prefix is not copied.

- | | | | | |
|------|------------|------------------|----------------|------------------------------|
| (53) | ku-gwa | 'to fall' | ku-gwaa-gwa | 'to fall about' |
| | ku-sya | 'to grind' | ku-syaa-sya | 'to grind here and there' |
| | ku-gu-sya | 'to grind it' | ku-gu-syaa-sya | 'to grind it here and there' |
| | a-ka-za | 'he went' | a-ka-zaa-za | 'he went about' |
| | ba-láá-há | 'they will give' | ba-laa-háá-ha | 'they will give some' |
| | a-ka-tú-há | 'he gave us' | a-ka-tú-háa-ha | 'he gave us a bit' |

Lack of prefixal overcopy when there is phonological fusion between stem and prefix indicates that respect for morphological alignment of the base and the stem is of highest priority in verbs, whereas in nouns and adjectives, the structure of the base is adjusted so that the base and reduplicant are both identical and left-aligned with a syllable. The failure to overcopy prefixal material where the stem is subminimal can also be explained by appeal to a strict exclusion of prefixal material from the base in verb reduplication, though it may also be that there simply is no bisyllabicity requirement for reduplicated verbs: at any rate, there is at this point no overt evidence for such a condition in verbs (but see the discussion of asymmetrical reduplication where such evidence will be considered).

As before, it is necessary to consider the question of identifying the base versus the reduplicant. Previously, two considerations have been called on to distinguish base and reduplicant — reduplicants are or may be rendered toneless, and the vowel of a monosyllabic stem is lengthened in the reduplicant. The data in (53) would appear to support the claim that the reduplicant is a prefix, since the lefthand token of the stem has a long vowel. However, counterbalancing this consideration is the fact that monosyllabic verb roots are generally associated with special length properties. The suffixes for the applied, causative and reciprocal forms of the verb begin with underlyingly short vowels, as indicated in (54).

Kikerewe between *y*-initial stems and vowel-initial stems, so the analysis of these alternation could go either way.

- | | | |
|------|--------------|---------------------|
| (54) | ku-bon-a | 'to see' |
| | ku-bon-el-a | 'to see for' |
| | ku-bon-esy-a | 'to cause to see' |
| | ku-bon-an-a | 'to see each other' |

When preceded by a verb root of the form C(G), these suffixes have long vowels.

- | | | |
|------|--------------|-------------------------|
| (55) | ku-mwa | 'to shave' |
| | ku-mw-aan-a | 'to shave each other' |
| | ku-mw-eel-a | 'to shave for' |
| | ku-mw-eesy-a | 'to cause to shave' |
| | kú-h-á | 'to give' |
| | hu-h-éésya | 'to cause to give' |
| | ku-h-aan-a | 'to give each other' |
| | kú-t-á | 'to release' |
| | ku-t-áán-a | 'to release each other' |

Hence the lengthening found in the reduplicant of a monosyllabic verb may reflect this special property of this class of roots, rather than reflecting a minimality constraint on the reduplicant. Other evidence will be considered later which gives stronger support to the existence of a bisyllabic minimality condition as well as a bimoraic stem minimality condition.

Still, the distribution of long vowels at the end of the reduplicant does provide some information bearing on the minimality issue. Given that a monosyllabic reduplicant ends in a long vowel, this would suggest that the reduplicant is not at the edge of a phonological word. However, consider the following examples of reduplication in verbs which end in a consonant-plus-glide sequence.

- | | | |
|------|------------------------------|-----------------|
| (56) | ku-bal-w-a-bal-w-a | 'to be counted' |
| | ku-básy-á-basy-a | 'to catch' |
| | ku-chéélélelw-a-cheelelelw-a | 'to be late' |
| | ku-gelezy-a-gelezy-a | 'to sprinkle' |
| | ku-yébw-á-yebw-a | 'to forget' |

Although the reduplicant ends in a sequence of consonant plus glide — a context where vowels always surface as long — the reduplicant ends in a short vowel. It cannot simply be the case that these verb stems are exceptions to this otherwise exceptionless generalization regarding vowel length; as (57) shows, the final vowel is in fact long when it is followed by a clitic.

- | | | |
|------|---------------------|-----------------------|
| (57) | ku-bal-w-áá-yó | 'to be counted there' |
| | ku-bá'sy-áá-gá | 'to catch who?' |
| | ku-chéélélelw-áá-hó | 'to be late a bit' |
| | ku-gelezy-áá-kí | 'to sprinkle what?' |

Such data argue that the reduplicant in verbs must end a phonological word; yet the data from monosyllabic stems argues, on the contrary, that the last vowel of a reduplicant cannot be at the end of a phonological word.

These contradictions can be understood if a bisyllabic minimality condition is assumed for the reduplicant. Two constraints are relevant in implementing the minimality condition for verbal reduplication.

- (58) **Red=Pword** (Align(Red,R,Pword,R);Align(Red,L,Pword,L))
 Pword > σ

When the reduplicant is bisyllabic or longer, these constraints force the reduplicant to end a phonological word, which thus precludes long vowels at the end of the reduplicant (phonological words are enclosed in brackets).

(59)

ku-RED-balwa	Pword > σ	Red=Pword	*VV] _{pword}	*CGV
ku-[balwa]-[balwa]				**
ku-[balwa-balwa]		*!		**
ku-[balwaa-balwa]		*!		*
ku-[balwaa]-[balwa]			*!	*

On the other hand, with a monosyllabic root, the reduplicant cannot form a phonological word, hence no constraint prohibits a long vowel at the end of the reduplicant.

(60)

ku-RED-gwa	Pword > σ	Red=Pword	*VV] _{pword}	*CGV
ku-[gwaa]-[gwa]	*!		*	*
ku-[gwa]-[gwa]	*!			**
ku-[gwaa-gwa]		*		*
ku-[gwa-gwa]		*		*!*

It was noted above in connection with examples like *omuhyo'múhyó* 'a real knife' that the nominal reduplicant ends a phonological word — this same conclusion has just been argued for in the case of verbs. However, there is a substantial empirical difference between nouns and verbs with respect to final vowel length, and that is that the reduplicant of a noun never exhibits final vowel length, even when monosyllabic. This difference between nouns and verbs is actually a side-effect of a more basic difference between nouns and verbs. Whereas the reduplicant of a noun can include a prefixal syllable in order to satisfy the reduplicant minimality condition, this is disallowed in verbs. From this fact, it follows that nouns actually can satisfy the minimality condition on reduplicants, which is mediated through phonological word constituency, and therefore a noun reduplicant always forms a phonological word. Since verbs cannot recruit prefixal material to satisfy the minimality condition, the alternative selected is that the reduplicant cannot define a phonological word just in case it is monosyllabic.

Tonal data does nothing to clarify whether reduplication is prefixing or suffixing. Consider the data in (61), drawn from the infinitive, hodiernal perfective, and remote past tense. It will be noticed that lexically H toned verbs manifest the H tone on the left-most token of the stem, which has been identified as the reduplicant.

- (61) a. Toneless verbs
- | | | |
|-------------|--------------------|----------------------|
| ku-bala | ku-bala-bala | 'to count' |
| twaa-bazile | twaa-bazile-bazile | 'we counted (today)' |
| aka-bala | aka-bala-bala | 'he counted (rem.)' |
- b. H toned verbs
- | | | |
|-------------|--------------------|---------------------|
| ku-bála | ku-bála-bala | 'to kick' |
| twaa-bázile | twaa-bázile-bazile | 'we kicked (today)' |
| aka-bála | aka-bála-bala | 'he kicked (rem.)' |

Such examples might be taken to indicate that reduplication is suffixal in verbs. However, further investigation into verbal tonology indicates that the location of tone in the verb does not distinguish between the hypothesis of prefixing versus suffixing reduplication.

There are no significant restrictions on the location of H tone in nouns and adjectives, apart from the fact that there is at most a single H. In verbs, on the other hand, the location of tone is highly constrained. Tense-aspect categories can be divided into four groups, with respect to where tones appear within the stem — see Odden (1995b) for further discussion. The simplest and most common group has the so-called base tone pattern; in the base pattern, toneless verbs remain toneless and H toned verbs have a H on the first syllable of the stem. Further illustrations of the base tone pattern, as seen in (61), drawn from the infinitive, are seen below.

- (62)
- | | | | |
|---------------|------------------------|----------------|--------------|
| ku-bíbika | 'to border on' | ku-bónékana | 'to appear' |
| ku-bíihililwa | 'to be angry' | ku-bóóbóota | 'to babble' |
| ku-búgáángana | 'to meet' | ku-chééíélelwa | 'to be late' |
| ku-góóngóbola | 'to peel banana stem' | ku-hééndágula | 'to break' |
| ku-hólóólóka | 'to be in low spirits' | ku-nááláámula | 'to scatter' |

No verb stem in the base pattern has H associated with any syllable other than the initial syllable (from which position it spreads one syllable to the right); thus tones in verbs are subject to a high-ranking constraint requiring H to be aligned with the left edge of the stem. It has been assumed here that the stem and reduplicant are joined into a single structure referred to as the extended stem: the extended stem is the domain within which verbal tone is assigned. Therefore the appearance of H in the reduplicant and its lack in the base is of no consequence for identifying the base versus the reduplicant. The high-ranking constraints governing the position of tone in verbs simply override the constraint *H which otherwise would result in a toneless reduplicant.

In other tenses, a melodic H tone is added to all stems. In tenses such as the remote past relative and the hesternal past, this H is assigned to the final syllable (where it spreads to the preceding syllable if the verb is prepausal, due to general prepausal leftward H spread). When the verb is reduplicated, H appears on the absolute word-final syllable, i.e. at the end of the extended stem.¹⁴

- | | | | |
|------|-------------|--------------------|---------------------------|
| (63) | ku-bala | ku-bala-bala | 'to count' |
| | m-bazilé | m-bazile-bazilé | 'I counted (yest)' |
| | abaa-bazilé | abaa-bazile-bazilé | 'they who counted (rem.)' |
| | ku-bíba | ku-bíbá-biba | 'to plant' |
| | m-bibílé | m-bibile-bibílé | 'I planted (yest)' |
| | abaa-bibílé | abaa-bibile-bibílé | 'they who planted (rem.)' |

In the near future tense, where a melodic H is assigned to the penultimate syllable, that H appears on the penult of the entire verb.

- | | | | |
|------|----------------|-------------------------|----------------------------------|
| (64) | balaa-balilána | balaa-balilana-balilána | 'they will count for each other' |
| | balaa-bibilána | balaa-bibilana-bibilána | 'they will plant for each other' |

Thus H tone in verbs is not systematically excluded from the rightmost stem-like portion of the verb; again, this is due to the fact that the positioning of H tone in verbs is governed by high-ranking constraints, which override the tendency of reduplicants to be toneless. Consequently, the position of tone cannot be called on to decide whether reduplication in verbs is prefixing or suffixing.

One further phonological matter must be attended to before the analysis of full-copy reduplication is complete. It was noted in (52) that stem initial *y* optionally deletes when it is intervocalic. While initial *y* in the reduplicant may delete in this position, *y* in the base cannot delete.

- | | | | |
|------|--------------------|--------------------|------------|
| (65) | ku-yáángá-yaanga | kw-áángá-yaanga | 'deny' |
| | *ku-yááng-áanga | *kw-ááng-áanga | |
| | ku-yátá-yata | kw-áátá-yata | 'cut' |
| | *ku-yát-áata | *kw-áát-áata | |
| | ku-yéembá-yeemba | kw-éémbá-yeemba | 'sing' |
| | *ku-yéemb-éemba | *kw-éémb-éemba | |
| | ku-yeleela-yeleela | kw-eeleela-yeleela | 'float' |
| | *ku-yeleel-eleela | *kw-eeleel-eleela | |
| | ku-yílúka-yiluka | kw-íílúka-yiluka | 'run away' |
| | *ku-yílúk-eeluka | *kw-íílúk-eeluka | |
| | ku-yómá-yoma | kw-óómá-yoma | 'be dry' |
| | *ku-yóm-óoma | *kw-óóm-óoma | |

¹⁴ In prepausal position, this final H must spread to the preceding syllable, as noted above.

This restriction follows from the assumed morphological structure of the verb, in particular the assumption that the reduplicant and stem join together in forming the extended stem, in conjunction with independently motivated principles regarding deletion of *y*. Deletion of *y* is not freely available in all positions. While *y* has a rather restricted distribution, appearing most frequently at the beginning of the stem, *y* also appears in stem-medial position. In that position, *y* never deletes.¹⁵

(66)	ku-bóya	*kú-bw-á	'fight'
	ku-gaya	*kú-g-á	'despise'
	ku-gay-an-a	*ku-g-aan-a	'despise each other'
	ku-geya	*ku-gy-a	'speak ill'
	kw-oya	*kw-a	'take a break'
	ku-saaya	*ku-s-a	'get angry'

Deletion of *y* must therefore be restricted to 'initial' position — specifically, initial position within the extended stem, which is the constituent containing both the base and reduplicant. Since only the initial *y* of the reduplicant is in that position, it alone is in the proper position for deletion.

5.2. Asymmetrical Copy

Consideration of the asymmetric pattern of reduplication does yield clear evidence that the reduplicant is a prefix in verbs. In previous examples of verb reduplication, every element present in the base appears in the reduplicant. Additionally, there is a freely available phonological variant of reduplication which is realized by partially copying elements from the base into the reduplicant. One of these optional variations in the pattern of reduplication selects all elements from the base except for the final tense-aspect morpheme. The data in (67) exemplify this pattern, and are drawn from the subjunctive, which has the structure derivational stem+*e*, where *-e* marks the subjunctive. In the asymmetrical reduplication pattern, the subjunctive tense-aspect morpheme *-e* is not copied, and the default final suffix *-a* is used instead (at least for these examples).

(67)	Base form	Asymmetrical reduplicant	Symmetrical reduplicant	
	ni-tu-lím-é	ni-tu-lim-a-lím-é	ni-tu-lím-e-lím-é	'we should cultivate'
	noo-hahúúl-é	noo-habuul-a-habúúl-é	noo-habuul-e-habúúl-é	'you should advise'
	ni-ba-tafún-é	ni-ba-tafun-a-tafún-é	ni-ba-tafun-e-tafún-é	'they should chew'

Whereas the leftmost token of the stem, the reduplicant, may manifest this less marked morphological structure, the rightmost token, the base, must be inflected with the subjunctive suffix. If the reduplicant is a prefix, the conditions for non-occurrence of the

¹⁵ Deletion of *y* in non-stem initial position would result in quite radical reduction of the verb stem. Simple deletion for example *ku-bóy-a* → *ku-bó-a* would be impossible, since the language allows no vowel sequences. Instead, the vocalic elements merge into a single long syllable. However, long vowels are prohibited word-finally, so deletion of *y* in *-bóya* would inevitably lead to **-bwá*.

subjunctive affix can be stated locally, as a property of the reduplicant. If the reduplicant were a suffix, it would be more difficult to state the conditions under which *-e* may be excluded from the base, namely when the base is followed by a reduplicant.

- (68) *ni-tu-lim-e-lím-á
 *noo-habuul-e-habúúl-á
 *ni-ba-tafun-e-tafún-á

Another manifestation of asymmetric reduplication is that derivational extensions such as the applicative suffix *-il-*, the causative *-isy-*¹⁶ and the reciprocal suffix *-an-* may be ignored in copying. Thus, the asymmetrical reduplicants in (69) reflect only the verb root.

- | | | |
|------|--------------------------------|--------------------------|
| (69) | ku-bón-án-a-bon-an-a | ku-bón-á-bon-an-a |
| | 'to see each other' | |
| | ku-yéemb-él-a-yeemb-el-a | ku-yéemb-á-yeemb-el-a |
| | 'to sing for' | |
| | ku-kám-ísy-a-kam-isy-a | ku-kám-á-kam-isy-a |
| | 'to cause to milk' | |
| | ku-hákúl-il-an-a-hakul-il-an-a | ku-hákúl-a-hakul-il-an-a |
| | 'to take out for each other' | |
| | ku-lim-il-an-a-lim-il-an-a | ku-lim-a-lim-il-an-a |
| | 'to cultivate for each other' | |

Interestingly, partial reduplication of a stem which contains two or more derivational suffixes may copy a contiguous sequence of such suffixes which follow the root. Discontinuous copying from the derivational stem is disallowed.

- (70) ku-lim-il-a-lim-il-an-a 'to cultivate for each other'
 *ku-lim-an-a-lim-il-an-a

It can be shown that the contiguity constraint must be stated in terms of the derivational stem, not the entire inflectional stem. The relevant evidence involves verbs in the subjunctive tense, where the stem contains derivational affixes. As (71) shows, an asymmetrical reduplicant may select a subset of the derivational affixes of the base followed by the final affix *-a*, or the reduplicant can be composed of the bare root plus the subjunctive affix *-e*.

- | | | |
|------|---------------------|-------------------------|
| (71) | nee-kam-a-kám-w-é | 'they should be milked' |
| | nee-kam-w-a-kám-w-é | = |
| | nee-kam-e-kám-w-é | = |

¹⁶ These suffixes have the vowel-harmonic variants *-el-* and *-esy-* after mid vowels.

ni-ba-kam-a-kam-isy-é	'they should cause to milk'
ni-ba-kam-isy-a-kam-isy-é	=
ni-ba-kam-e-kam-isy-é	=
ni-ba-lim-a-lim-il-án-é	'they should cultivate for each other'
ni-ba-lim-il-a-lim-il-án-é	=
ni-ba-lim-il-an-a-lim-il-án-é	=
ni-ba-lim-e-lim-il-án-é	=
ni-ba-lim-il-e-lim-il-án-é	=

It should be pointed out that the three most common patterns are either total reduplication, reduplication of just the root followed by *-a*, and reduplication of the root followed by *-e*; forms such as *ni-ba-lim-il-e-lim-il-án-é* are not as strongly accepted. Nevertheless, such forms are ultimately acceptable, in contrast to completely ill-formed examples such as **ku-limana-limilana* with discontinuous copying within the derivational stem.

The requirement that the reduplicant be a contiguous subpart of the derivational stem will be enforced by the following constraint.

- (72) **Redup-Contig:** The reduplicant must correspond to a contiguous substring of the derivational stem.

Another restriction on partial copying of the base is that entire morphemes must be copied. Thus the following patterns where only parts of a stem or affix are reduplicated are excluded.

- | | | |
|------|-----------------------|----------------------|
| (73) | *ku-kala-kalaanga | 'to fry' |
| | *ku-bibi-bibika | 'to border' |
| | *ku-héézú-heeluka | 'blow off (of roof)' |
| | *ku-héléélú-heleeluka | 'be last' |
| | *ku-héléé-heleeluka | 'be last' |
| | *ku-bali-bal-il-a | 'to count for' |
| | *ku-balis-a-bal-isy-a | 'to cause to count' |

The Morpheme Integrity constraint guarantees that partial copying of morphemes is blocked (see Mutaka & Hyman 1990).

- (74) **Morpheme Integrity:** the segment at the edge of the d-stem in the reduplicant must have a correspondent at the edge of the morpheme in the base

Constraints (72) and (74) thus account for the ability to select a subset of the derivational stem, but so far we have no account of the fact that the final tense aspect morpheme may vary between *-a* and *-e*, the latter being expected on morphological grounds. The fact that the reduplicant terminates with the vowel *-a* is consistent with the fact that Kikerewe tolerates no coda consonants. The precise selection of *-a* over all other vowels reflects a constraint requiring the reduplicant to have the appearance of a

'canonical stem' — see Downing 1994 for discussion. Except in marked circumstances, namely in the subjunctive and perfective, all verb stems end in the vowel *-a*, a morpheme which has no semantic contribution and which simply indicates that the form in question is a verb. There is no independent evidence that *a* is a phonological 'default vowel'. Consideration of the pattern of epenthesis in loanwords suggests that *i* is actually the vowel inserted to repair illicit consonant sequences. Loanword evidence must be used with caution, since it is not always clear what the immediate source of loanwords in Kikerewe is. In particular, it is probable that all apparently current loanwords from English actually derive via Swahili (which also resolves codas and onset clusters by vocalic epenthesis). However, there are loanwords, especially ones introduced by French-speaking missionaries, which did not enter Kikerewe via Swahili. Particularly indicative are personal names such as *Sumáálídi* 'Sumard', *Malisééli* 'Marcel', *Maliko* 'Marc',¹⁷ where the epenthetic vowel is *i*.

A complete analysis of this variation in the selection of the final inflectional affix will not be undertaken here, since it would involve many issues which are tangential to the present paper. It will simply be assumed that there are competing requirements for the inflectional suffix within the reduplicant — either that it be *-a*, or that it be the tense-aspect appropriate suffix *-e* — and that by allowing either strategy to be followed, the existing range of variation in forms is accounted for.

Another example of asymmetrical reduplication involves the perfective form of the stem. The perfective stem involves a morpheme which may be abstractly represented as *-ile*, and which has a number of surface variants. Since the interaction between perfective stem-formation and reduplication depends crucially on the principles of stem-formation for the perfective, a brief digression is necessary to establish those principles.

The primary variant of the perfective is the suffix *-ile*, which appears with the widest variety of stem types.

(75)	ku-bík-a	a-bík-ílé	'he announced a death'
	ku-bís-a	a-bís-ílé	'he concealed a fact'
	ku-báník-a	a-baník-ílé	'he roasted'
	ku-gololok-a	a-gololok-ílé	'he was straightened out'
	ku-hágám-a	a-hagam-ílé	'he was too big'

The perfective suffix is associated with a morphophonemic change in final oral coronals, whereby *t* → *s*, and *d, l* → *z*.

(76)	ku-ful-a	a-fuz-ílé	'he cleaned'
	ku-lol-a	a-loz-ílé	'he saw'
	ku-buut-a	a-buus-ílé	'he choked'
	ku-biind-a	a-biinz-ílé	'he tucked in a loincloth'
	ku-geend-a	a-geenz-ílé	'he went'

¹⁷ Especially in names with a clear biblical origin, names tend to retain the gender-appropriate theme vowel from Greek, *-o* for masculine and *-a* for feminine names: cf. *Maalita* 'Martha', *Peetelo* 'Peter'.

Note that this spirantizing effect is not a general property of all *ti*, *li* and *di* sequences: cf. *kufulila* 'to lean for', *kubuutila* 'to choke for' and *kubiindila* 'to tuck in a loincloth for'. This spirantization takes place only before the perfective suffix *ile*, the causative suffix *y*, and the nominalization suffix *-i*.

The second variant of the perfective is the so-called imbrication variant (Bastin 1983, Hyman 1995). In the imbrication variant, the vowel *i* is infixed before the stem-final consonant and the suffix *-e* is added. The would-be vowel sequence is resolved so that *oi* → *wee*, *ui* → *wii*, *ii*, *ei* → *ee* and *ai* → *ee*. The imbrication variant is selected by any stem which contains at least two moras, where the final consonant is *l*.

(77)	ku-lwáál-a	a-lw-ée-l-é	'he is ill'
	ku-láál-a	a-l-ée-l-é	'he lied down'
	ku-bágál-a	a-bag-ée-l-é	'he weeded'
	ku-nyegel-a	a-nyeg-ée-l-é	'he itched'
	ku-limil-a	a-lim-í-l-é	'he cultivated for'
	ku-goongobol-a	a-goongobw-ée-l-é	'he debark'
	ku-hálúl-a	a-halw-í-l-é	'he scraped the pot'
	ku-luguul-a	a-lugw-í-l-é	'he was surprised'

Monosyllabic verbs stems select a variant of the perfective with a long vowel.¹⁸

(78)	ku-gw-a	a-gw-íílé	'he fell'
	ku-z-a	a-z-íílé	'he went'
	ku-mw-a	a-mw-éélé	'he shaved'
	kú-ly-á	a-l-íílé	'he ate'
	kú-nw-á	a-nw-éélé	'he drank'
	kú-h-á	a-h-éélé	'he gave'
	kú-t-á	a-t-éélé	'he released'

As noted earlier, lengthening is a general property of these stems, cf. *ku-mw-aan-a* 'to shave each other' vs. *ku-bal-an-a* 'to count each other'.

Longer stems which end in a glide introduce a further complication. In a stem of the form *CVCw*, the basic perfective suffix *-ile* is selected: note, however, that the glide *w* is infixed within the perfective suffix *-ile*.

(79)	ku-bóhw-a	a-boh-íl-w-é	'he was tied'
	ku-lihw-a	a-lih-íl-w-é	'he was paid'
	ku-kúgw-a	a-kug-íl-w-é	'he was found'
	ku-manyw-a	a-many-íl-w-é	'he was known'

¹⁸ Certain stems are associated with phonetically unpredictable lowering of the vowel of the perfective suffix. A full analysis of this problem is outside the scope of this paper, but could be handled by postulating a floating partial specification for vowel height following the stem final consonant.

If the perfective suffix then comes to stand after *l*, *t* or *d*, spirantization affects the final consonant.

- | | | | |
|------|-------------|----------------|--------------------|
| (80) | ku-búlw-a | a-buz-íl-w-é | 'he failed to get' |
| | ku-lolw-a | a-loz-íl-w-é | 'he was seen' |
| | ku-liindw-a | a-liinz-íl-w-é | 'he was guarded' |
| | ku-bátw-a | a-bas-íl-w-é | 'he was snared' |

When the stem ends in the sequence *Cy*, the suffix *-iizye* is employed. The *y* in this variant of the suffix presumably represents the stem-final *y*, infixd within the perfective suffix.

- | | | | |
|------|-------------|-----------------|----------------|
| (81) | ku-koby-a | a-kob-íiz-y-é | 'he picked up' |
| | ku-hiingy-a | a-hiing-íiz-y-é | 'he exchanged' |
| | ku-lóby-a | a-lob-íiz-y-é | 'he wetted' |

A number of stems end with *-zy*, which derives from underlying /*ly*/. In the perfective of such stems, the glide *y* which ordinarily conditions the change *ly* → *zy* is infixd within the perfective suffix, and therefore *l* does not spirantize in the perfective of such verbs.

- | | | | |
|------|-------------|-----------------|----------------------|
| (82) | ku-guzy-a | a-gul-íiz-y-é | 'he sold' |
| | ku-kizy-a | a-kil-íiz-y-é | 'he rescued' |
| | ku-lozy-a | a-lol-íiz-y-é | 'he tried' |
| | ku-boonzy-a | a-boond-íiz-y-é | 'he had a foretaste' |

For example, [kuguzya] derives from /kugulya/ via this spirantization process. In accord with the constraints of the language regarding selection of perfective allomorphs and the positioning of glides within the stem, the perfective stem of this verb might be expected to be *-guliilye*; but because of the spirantizing effect of *y*, the surface form is *-guliizye*.

Returning to the main theme of asymmetrical reduplication in the perfective, the examples of (83) show that in the asymmetrical variant, the suffix *-ile* does not appear in the reduplicant, and the final suffix *-a* appears in its place.

- | | | | | |
|------|------------|-------------|---------------------|-----------------------|
| (83) | ku-bís-a | a-bis-ílé | a-bis-a-bis-ílé | 'he concealed a fact' |
| | ku-bánik-a | a-banik-ílé | a-banik-a-banik-ílé | 'he roasted' |
| | ku-hágám-a | a-hagam-ílé | a-hagam-a-hagam-ílé | 'he was too big' |

These examples are analogous to the subjunctive examples in (67), where the tense-aspect suffix *-e* is excluded from the reduplicant, and therefore *-a* appears in its place.

Also analogous to the subjunctive, the base must manifest the perfective affix, which excludes the following patterns where the reduplicant but not the base is marked with the perfective.

- (84) *a-bis-ile-bis-á
 *a-banik-ile-baník-á
 *a-hagam-ile-hagám-á

This further supports the claim that reduplication is prefixing in verbs. Under the hypothesis that reduplication were suffixing, there would be no reason for the supposed base *bisa* in *a-bisa-bisile* to lack the perfective suffix when the reduplicant manifests the suffix; there would also be no reason why forms such as (84) are impossible, where the supposed base, the leftmost token of the stem, contains all of the morphemes which it would be expected to contain, while the reduplicant only contains a portion of the base morphemes. Under the assumption that reduplication is prefixing, these patterns are explainable. The reduplicant may be less marked than the base — it may lack elements found in the base — but it cannot be more marked — it cannot contain elements not found in the base.¹⁹

The first significant complication in the phonological pattern of asymmetric reduplication is seen with stems which end in an oral coronal, which spirantizes before the perfective suffix *-ile*. As the data below demonstrate, there is no spirantization of the final consonant in the reduplicant, even though its correspondent in the base spirantizes.

- | | | | | |
|------|------------|-------------|---------------------|----------------------------|
| (85) | ku-lol-a | n-doz-ílé | n-dol-a-loz-ílé | 'I saw' |
| | ku-ful-a | a-fuz-ílé | a-ful-a-fuz-ílé | 'he cleaned' |
| | ku-kuut-a | a-kuus-ílé | a-kuut-a-kuus-ílé | 'he threshed seeds' |
| | ku-biind-a | a-biinz-ílé | a-biind-a-biinz-ílé | 'he tucked in a loincloth' |
| | ku-geend-a | a-geenz-ílé | a-geend-a-geenz-ílé | 'he went' |

The example *ndolalozile* particularly underscores the nature of the problem. While the number and identity of the segments in the base and reduplicant should be the same, it is evident that the consonants of the reduplicant, *dola*, do not match the base, *lozile*. This is because the content of the reduplicant in Kikerewe does not depend on matching the reduplicant with the surface nature of the base, but rather depends on matching the reduplicant with the underlying shape of the base. The underlying form of *ndolalozile* is *n-RED-lol-ile*, and it is obviously identity with the underlying form that the reduplicant is striving towards.

A perfect match between the reduplicant and the underlying form of the base would be achieved in **nlolalozile*. However, such perfection could only be achieved at the expense of violating the constraint against *nl*, and this constraint is unviolated in the language. Thus it is inevitable that identity constraints must be violated. If the initial *l* in the reduplicant alone is changed, then the surface identity of the base and reduplicant segments will be destroyed. The correct form for both the base and the reduplicant results from subordinating all of the faithfulness constraints to the (unviolable) phonological

¹⁹ Of course, the reduplicant may be more faithful to the phonologically underlying form of the base due to IR faithfulness constraints and the base may be made less faithful to its underlying form due to high ranking phonological constraints. However that is not the situation here: the differences between which morphemes are present in the base and reduplicant are not due to any general phonological constraints.

constraints, and subordinating the requirement of surface base-reduplicant identity to the constraints requiring identity between the surface forms of the reduplicant or base and the input. (See Poletto, this volume, for discussion of a similar problem in Runyankore).

(86)

n-RED-lol-ile	*nl	*l+i _{perfective}	Ident-IO	Ident-IR	Ident-BR
nlolalozié	*!		z		l≠z
ndoladozié			z,d!	d	l≠z
ndoladolíé		*!		d	
ndozaalozié			z	d,z!	d≠l
ndolalozié			z	d	d≠l, l≠z

As long as the underlying form of the base does not end in a sequence of consonant plus glide, the segments of the reduplicant correspond to a contiguous substring of the surface form of the base, and thus there is a contiguous correspondence between the reduplicant *do!* and the base *loz*. However, when the underlying form of the stem ends in a glide, the reduplicable segments will not be contiguous in the base at the surface level. Recall that a stem-final glide is repositioned so that it appears in the last syllable of the verb, in this case appearing infix within the perfective affix, so the stem *boh-w-* has the perfective form *boh-il-w-e*. As can be seen in (87), the reduplicant selects the segments found in the underlying form of the base, save for the perfective morpheme itself: but this substring is not contiguous in the surface form of the base.

- (87) ku-bóh-w-a a-boh-íl-w-é a-boh-a-boh-íl-w-é 'he was tied'
 ku-lih-w-a a-lih-íl-w-é a-lih-a-lih-íl-w-é 'he was paid'
 ku-kúg-w-a a-kug-íl-w-é a-kug-a-kug-íl-w-é 'he was found'

In the example *abohabohilwé*, the best possible match between the underlying form of the base and the reduplicant would occur if the reduplicant were *bohilwe*. This is not possible, since the reduplicant is explicitly barred from containing the perfective suffix (assuming the asymmetrical reduplication option); therefore, a substring of the base which excludes the offending perfective morpheme is selected. That substring, *boh-w-*, must be augmented with the default final suffix *-a*, to give a stem with the canonical shape of a verb stem, as required in this particular construction.²⁰

Further examples of asymmetrical reduplication involving the imbricated variant of the perfective can be seen below.

- (88) ku-lwáál-a a-lw-éé-l-é a-lwaal-a-lw-éé-l-é 'he is ill'
 ku-bágál-a a-bag-éé-l-é a-bagal-a-bag-éé-l-é 'he weeded'
 ku-hálúl-a a-halw-íí-l-é a-halul-a-halw-íí-l-é 'he scraped the pot'
 ku-fútán-a a-fut-éé-n-é a-futan-a-fut-éé-n-é 'he chewed'

²⁰ Another form of asymmetrical reduplication for this verb is *a-boha-bohilwé*, where the passive suffix *w* is not copied; this is consistent with the generalization that any continuous subset of the morphemes found in the derivational stem are reduplicated.

It is unclear exactly what should be the underlying phonological form in the case of imbricated perfectives. Assuming the standard notion of an underlying representation, the underlying form of *abagéélé* would combine the underlying form of the root *bagal* with some representation of the perfective suffix, perhaps *-ie* or *-ile*. Some set of constraints forces the initial vowel of the suffix to be infixated within the root, in which case it would be subject to constraints against V+V sequences. The important point is that the reduplicant is the base without the perfective, whether the perfective is realised on the surface as a discretely identifiable suffix following the stem, or as an infix blended with the segments of the stem.

In the examples considered so far, the reduplicant has been more faithful to the underlying form of the base than the base itself is: this is because divergence between underlying and surface forms in the base is compelled by factors specific to the perfective affix, an affix which is excluded from the reduplicant in asymmetrical reduplications. However, in one type of case, the base is more faithful to the underlying form of the stem than the reduplicant is, for the reason that the causal factor behind the phonological alternation is lacking in the base but is present in the reduplicant. It has been noted above that surface *zy* generally derives from /*y*/ via spirantization, so *kuguzya* derives from /*kugulya*/. Because the underlying stem-final glide is moved from its underlying position and is infixated into the perfective suffix, the underlying /*y*/ actually surfaces in the perfective of such a verb stem. Consequently, the perfective of such a stem — e.g. *gulíizyé* 'he sold' — is more faithful to the underlying representation than the non-perfective is; the *y* which might trigger spirantization is not adjacent to the stem-final *l* in the perfective. The tradeoff, in this case, is that faithfulness to the underlying order of segments results in unfaithfulness with respect to the quality of these segments, and vice versa. Because asymmetrical reduplications exclude the perfective suffix from the reduplicant, there is no factor which triggers separation of /*l*/ and /*y*/. Therefore, spirantization takes place in the reduplicant, even though there is no spirantization in the base.

- | | | | | |
|------|-------------|-----------------|--------------------------|----------------------|
| (89) | ku-guzy-a | a-gul-íiz-y-é | a-guzy-a-gul-íiz-y-é | 'he sold' |
| | ku-kizy-a | a-kil-íiz-y-é | a-kizy-a-kil-íiz-y-é | 'he rescued' |
| | ku-lozy-a | a-lol-íiz-y-é | a-lozy-a-lol-íiz-y-é | 'he tried' |
| | ku-boonzy-a | a-boond-íiz-y-é | a-boonzy-a-boond-íiz-y-é | 'he had a foretaste' |

There is an important limitation on asymmetric reduplication regarding stem size, which argues for a minimal size constraint on the reduplicant even in verbs. Monosyllabic stems reduplicate, and when they do, they appear with a long vowel. Asymmetric reduplication is possible with such stems in the subjunctive, as the following data illustrate. The vowel of the reduplicant, whether *-e* by strict copy or *-a* in the asymmetrical variant, always appears as long.

- | | | | | |
|------|-----------|----------------|----------------|---------------------|
| (90) | ni-tú-gwé | ni-tu-gwée-gwé | ni-tu-gwáá-gwé | 'we should fall' |
| | ni-tú-zé | ni-tu-zée-zé | ni-tu-záá-zé | 'we should go' |
| | ni-tú-nwé | ni-tu-nwée-nwé | ni-tu-nwáá-nwé | 'we should drink' |
| | ni-tú-hé | ni-tu-hée-hé | ni-tu-háá-hé | 'we should give' |
| | ni-tú-té | ni-tu-tée-té | ni-tu-táá-té | 'we should release' |

It has been shown above that this vowel length is due to independent factors.

However, asymmetrical reduplication is not possible in the perfective of monosyllabic stems.

- | | | | | |
|------|--------|-----------------|----------------|---------------|
| (91) | ku-gwa | a-gwiile-gwiílé | *a-gwaa-gwiílé | 'he fell' |
| | ku-za | a-ziile-ziílé | *a-zaa-ziílé | 'he went' |
| | ku-mwa | a-mweele-mwéélé | *a-mwaa-mwéélé | 'he shaved' |
| | kú-lyá | a-liile-liílé | *a-lyaa-liílé | 'he ate' |
| | kú-nwá | a-nweele-nwéélé | *a-nwaa-nwéélé | 'he drank' |
| | kú-há | a-heele-héélé | *a-haa-héélé | 'he gave' |
| | kú-tá | a-teele-téélé | *a-taa-téélé | 'he released' |

The question is why there should be a difference between the perfective and subjunctive in terms of the possibility of asymmetric reduplication. The reduplicant prefers to be bisyllabic, but material is never epenthesized to achieve bisyllabicity; verbal reduplicants also cannot contain prefixal material. In light of these facts, reduplicated monosyllabic roots are under a considerable and apparently unrelievable pressure to satisfy the bisyllabicity condition. All else being equal, reduplication may freely include or exclude the final tense-aspect affix. The crucial observation is that all is not equal between symmetrical and asymmetrical reduplication in the perfective.

In the subjunctive, the reduplicant is fated to be monosyllabic, and selection of symmetric versus asymmetric reduplication is no better or worse with respect to the minimality requirement of the reduplicant.

- | | | | | |
|------|--------------|-----------|-------|--------|
| (92) | ni-tu-RED-he | Redup-Min | *infl | Max-BR |
| ☞ | ni-tu-háá-hé | * | | * |
| ☞ | ni-tu-héé-hé | * | * | |

In contrast, the asymmetric-copy variant in the perfective violates the bisyllabicity condition on reduplication; therefore, the full-copy option is the only viable option.

- | | | | | |
|------|----------------|-----------|-------|--------|
| (93) | tu-RED-h-ile | Redup-Min | *infl | Max-BR |
| | tu-haa-héélé | *! | | * |
| ☞ | tu-heele-héélé | | * | |

In this section, the productive pattern of reduplication in verbs has been shown to exhibit the following characteristics.

- (94)
- The reduplicant only contains material found in the stem.
 - Reduplication may be partial or complete: the root and optionally any contiguous sequence of derivational affixes may be copied.
 - The final inflectional morphemes for the subjunctive and the perfective are optionally copied.

- d. Asymmetrical reduplication of monosyllabic stems in the perfective is disallowed (due to the bisyllabic minimality constraint on the reduplicant).
- e. If the reduplicant is at least bisyllabic, it forms a phonological word, and therefore long vowels are shortened at the end of the reduplicant. Long vowels are retained in the reduplicant of a monosyllabic stem.

6. Lexical reduplication

There are a number of stems which are lexically reduplicated, for which there exists no related unreduplicated stem.

- | | | |
|------|------------------|---------------------------------|
| (95) | ku-bóhá-boha | 'to babble' |
| | ku-huuna-huuna | 'to wander aimlessly' |
| | ku-kaánzá-kaanza | 'to patch' |
| | ku-tééká-teeka | 'to think' |
| | ku-túúmá-tuuma | 'to grope aimlessly' |
| | ku-húgá-huga | 'to not have a good upbringing' |

These stems cannot be further reduplicated via the otherwise productive process of reduplication.

- (96)
- *ku-bóhá-boha-boha-boha
 - *ku-huuna-huuna-huuna-huuna
 - *ku-kaanza-kaanza-kaanza-kaanza
 - *ku-tééká-teeka-teeka-teeka
 - *ku-túúmá-tuuma-tuuma-tuuma
 - *ku-húgá-huga-huga-huga

These stems generally require asymmetrical reduplication. In the perfective, the reduplicant ends in *-a*, not the perfective suffix *-ile*.

- | | | | |
|------|------------------|----------------------|------------------------------------|
| (97) | a-boha-bohílé | *a-bohile-bohílé | 'he babbled' |
| | a-huuna-huunílé | *a-huunile-huunílé | 'he wandered aimlessly' |
| | a-teeka-teekílé | *a-teekile-teekílé | 'he thought' |
| | a-tuuma-tuumílé | *a-tuumile-tuumílé | 'he groped aimlessly' |
| | a-huga-hugílé | *a-hugile-hugílé | 'he didn't have a good upbringing' |
| | a-kaanza-kaazílé | *a-kaanzile-kaanzílé | 'he patched' |

For the last verb in (97), there exist two forms of the perfective: besides *akaanzazikaanzílé*, one also finds the form *akaanzakéénzé*, illustrating the imbrication variant of the perfective. Monosyllabic verb stems ending in *-aand-* do not otherwise allow imbrication — cf. *tu-laand-ilé* 'we interlaced sticks', *a-taand-ilé* 'he spread', *n-saand-ilé* 'I wooed'. Although there are no other polysyllabic verb stems which end in *-VVnd-*, the pattern where imbrication affects polysyllabic stems but not monosyllabic stems is well established — see the discussion of perfective formation above. This points to another difference between lexical versus productive patterns of reduplication. With productive

reduplication, the reduplicant is not included in the domain whose size determines the possibility of imbrication, thus we find *abazilé* 'he counted' and *abalabazilé* 'he counted here and there', never **abalabéélé* with imbrication. The reduplicant in a lexical reduplication, on the other hand, is at least optionally contained in the domain considered when choosing between the suffixing and imbricating variants of the perfective.

When lexically reduplicated stems are followed by derivational suffixes, those suffixes also cannot appear in the reduplicant.

- | | | |
|------|-----------------------------|---------------------------------|
| (98) | ku-bóhá-boh-el-a | *ku-bóhéla-boh-el-a |
| | 'to babble for' | |
| | ku-káanzá-kaanz-il-an-a | *ku-káanz-il-an-a-kaanz-il-an-a |
| | 'to patch for each other' | |
| | ku-tééká-teek-el-an-a | *ku-téék-él-án-a-teek-el-an-a |
| | 'to think about each other' | |

However, lexically reduplicated stems do not form a totally impermeable morphological unit, since the subjunctive affix may appear in the reduplicant.

- | | | | |
|------|---------------------|---------------------|----------------------------|
| (99) | naa-boha-bóhé | naa-bohe-bóhé | 'let him babble' |
| | naa-huuna-húúné | naa-huune-húúné | 'let him wander aimlessly' |
| | ni-tu-kaanza-káánzé | ni-tu-kaanze-káánzé | 'we should patch' |
| | nii-n-teeka-tééké | nii-n-teeke-tééké | 'let me think' |

Thus,

- (100) a. Lexical reduplication precludes productive reduplication.
 b. A lexical reduplicant is opaque to derivational affixation and perfective formation, but not subjunctive-affixation
 c. The base optionally joins with a lexical reduplicant to form a single domain for perfective formation.

7. Conclusions

In this paper, a number of strategies for reduplication in Kikerewe have been discussed. While certain principles hold across reduplication constructions, certain properties hold only in specific types of reduplication. It has been argued that the base for reduplication is not necessarily an immutable morphological structure such as the stem, but is rather a more fluid quasi-phonological constituent whose boundaries are subject to adjustment in order to satisfy other phonological constraints. Reduplication is prefixing in all constructions, and the reduplicant typically shows special properties such as the optional or obligatory loss of tone, or failure to copy morphemes from the base. In nouns and verbs, the two open lexical classes with reduplication, the reduplicant preferentially defines a phonological word. Finally, all forms of reduplication are subject to a bisyllabic minimality requirement, but constructions differ as to whether prefixal material can be copied.

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